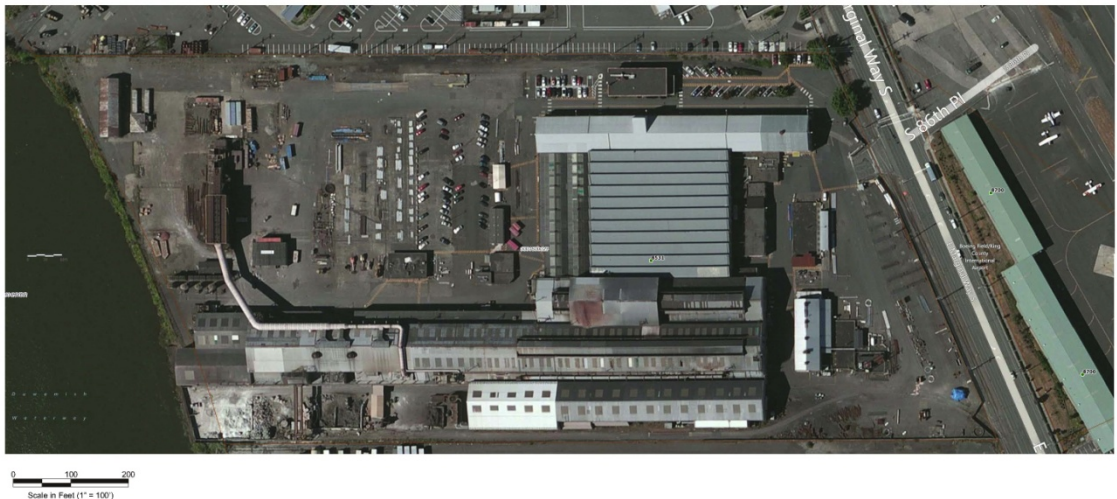

BASIS OF DESIGN REPORT

SECOND MODIFICATION FOR THE ADMINISTRATIVE ORDER ON CONSENT FOR REMOVAL ACTION JORGENSEN FORGE OUTFALL SITE—PHASE 4A/SHORELINE CONTAINMENT BARRIER



Property:

Jorgensen Forge Property
Jorgensen Forge Outfall Site
8531 East Marginal Way
Seattle, Washington

Prepared for:

U.S. Environmental Protection
Agency Region 10
1200 Sixth Avenue
Seattle, Washington

Report Date:

September 13, 2013

PRELIMINARY DRAFT – ISSUED FOR EPA REVIEW

Basis of Design Report

Second Modification for the Administrative Order on Consent for Removal Action, Jorgensen Forge Outfall Site—Phase 4A/Shoreline Containment Barrier

PRELIMINARY DRAFT – ISSUED FOR EPA REVIEW

Prepared for:

U.S. Environmental Protection Agency

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Jorgensen Forge Property
Jorgensen Forge Outfall Site
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Project No.: 0995-001-01

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- C Modifications to HASP

ACRONYMS AND ABBREVIATIONS

1H:1V	slope of 1 horizontal distance to 1 vertical rise
Anchor	Anchor QEA, LLC
bgs	below ground surface
Blue Wedge	the bank material prism characterization data gap
BODR	Basis of Design Report
Boeing	The Boeing Company
CERLCA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	corrugated metal pipe
Ecology	Washington State Department of Ecology
EMJ	Earle M. Jorgensen Company
EPA	U.S. Environmental Protection Agency
F&B	Friedman & Bruya, Inc.
FSP	Field Sampling Plan
HASP	Health and Safety Plan
JFC	Jorgensen Forge Corporation
JFEAA	Jorgensen Forge Early Action Area Removal Action
Jorgensen Forge Outfall Site	the area encompassing the northwest corner of the Jorgensen Forge Property and the southwest corner of the Boeing Plant 2 Property, subject to CERCLA Docket No. 10-2011-0017
KCIA	King County International Airport
LDW	Lower Duwamish Waterway
mg/kg	milligrams per kilogram
mg/kg dw	milligrams per kilogram dry weight
MHHW	mean higher high water

ACRONYMS & ABBREVIATIONS (CONTINUED)

MLLW	mean lower low water
MTCA	Washington State Model Toxics Control Act
Order	<i>Administrative Order on Consent for Removal Action, Comprehensive Environmental Response, Compensation, and Liability Act Docket No. 10-2011-0017</i>
Owners	Boeing and JFC
PCB	polychlorinated biphenyl
Phase 4A	Tasks to be completed under the Second Modification to the Administrative Order on Consent for Removal Action, including additional sampling to characterize the extent of PCB contamination within the Jorgensen Forge Outfall Site and the installation of a sheet pile wall along the top of the LDW shoreline bank
Pipes	Two decommissioned stormwater conveyance pipes located along the north margin of the Jorgenson Forge Property
PLS	Professional Land Surveyors
ppm	parts per million
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SoundEarth	SoundEarth Strategies, Inc.
TSCA	Toxic Substances Control Act

1.0 INTRODUCTION

This Basis of Design Report (BODR) has been prepared by SoundEarth Strategies Inc. (SoundEarth) on behalf of Jorgensen Forge Corporation (JFC) and The Boeing Company (Boeing; collectively, the Owners) pursuant to the *Second Modification to the Administrative Order on Consent for Removal Action (Order) at the Jorgensen Forge Outfall Site* (Second Modification; EPA 2013), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Docket No. 10-2011-0017, signed by JFC, Boeing and the U.S. Environmental Protection Agency (EPA) on July 17, 2013. The purpose of the BODR is to provide EPA with the necessary documentation of the scope of work to be performed at the Jorgensen Forge Outfall Site—Phase 4A/Shoreline Containment Barrier, under the Second Modification in accordance with its terms and conditions. The submittal of this BODR to the EPA shall be considered a Compliance Milestone pursuant to Condition No. 1 of the Second Modification.

1.1 REGULATORY AND LEGAL CONTEXT

The Jorgensen Forge Property is bounded by Boeing Plant 2 to the north, East Marginal Way and King County International Airport (KCIA) to the east, Boeing Isaacson Property to the south, and the Lower Duwamish Waterway (LDW) to the west (Figures 1 and 2). The LDW is the subject of on-going environmental investigation and removal actions resulting from the identification of upland sources of contaminants, most notably polychlorinated biphenyls (PCBs), which have contributed to contamination of the LDW environment.

Two stormwater conveyance pipes (Pipes) located along the north margin of the Property formerly discharged into the LDW near the northwest corner of the Jorgensen Forge Property (Jorgensen Forge Outfall Site). The outfalls served the KCIA, Boeing Plant 2, and JFC properties and have been identified as contributing conveyances of PCB contamination to the LDW environment.

As detailed in the *Action Memorandum for the Jorgensen Forge Outfall Site, Seattle, King County, Washington* (EPA 2010a), numerous environmental investigations documented the presence of elevated concentrations of PCBs in the Pipes, above the Washington State Model Toxics Control Act (MTCA) cleanup level for industrial soil (10 milligram per kilogram [mg/kg]) and EPA Regional Screening Levels for industrial soil and protection of groundwater (0.74 and 0.0088 mg/kg, respectively, for PCB Aroclor 1254). Due to these findings, the Washington State Department of Ecology (Ecology) requested in 2010 that EPA lead the cleanup of the Pipes. In accordance with the Ecology request, EPA issued the Order as a CERCLA action through the Office of Emergency Response to JFC and Boeing to first clean out solids contained within the Pipes and seal the clay sections of the Pipes.

In addition to the above-outlined regulatory and legal framework, the work described in this BODR is subject to the practical coordination between concurrent, adjacent, and future anticipated removal actions. Specifically, the work described in this BODR must be designed and performed in coordination with the Jorgensen Forge Early Action Area (JFEAA) Removal Action, Boeing's north-adjacent, Southwest Bank Corrective Measure, and other activities proceeding under the Resource Conservation and Recovery Act (RCRA) Corrective Action Order at Boeing Plant 2.

2.0 REPORT ORGANIZATION

The terms and conditions of the Second Modification require the preparation and submittal of this BODR, and require responses to eight topics defined in Conditions 2a through 2h of the Second Modification. The organization of this BODR parallels the structure of those conditional requirements.

Second Mod. Condition No.	Description	BODR Section
(Not applicable)	Introduction and regulatory framework	1.0 INTRODUCTION
(Not applicable)	Report organization	2.0 REPORT ORGANIZATION
2a	Summarize work completed under the Order and the First Modification to the Order, and the actions and objectives to be completed under this Second Modification.	3.0 WORK COMPLETED UNDER THE ORDER AND ITS MODIFICATIONS
2b	Summarize past data that characterize the nature and extent of PCB contamination in the vicinity of the Shoreline Containment Area.	4.0 NATURE AND EXTENT OF PCB CONTAMINATION
2c	Describe the means and methods for the collection and analysis of bank subsurface soil samples and installation of the shoreline containment barrier.	5.0 MEANS AND METHODS
2d	Identify performance criteria by which successful completion of the Removal Action to be completed under [the] Second Modification will be evaluated.	6.0 PERFORMANCE CRITERIA
2e	Identify the anticipated key Removal Action schedule milestone dates that will be refined following contractor selection.	7.0 ANTICIPATED SCHEDULE AND KEY MILESTONES
2f	Describe the project organization, responsibilities, and lead personnel qualifications.	8.0 PROJECT ORGANIZATION, RESPONSIBILITIES, AND LEAD PERSONNEL QUALIFICATIONS
2g	Describe activities that assure that performance criteria are met.	9.0 DOCUMENTATION AND REPORTING REQUIREMENTS
2h	Identify sustainable remediation practices that can be implemented as part of the Removal Action in accordance with Region 10 guidance.	10.0 SUSTAINABLE REMEDIATION PRACTICES
(Not applicable)	References	11.0 REFERENCES

3.0 WORK COMPLETED UNDER THE ORDER AND ITS MODIFICATIONS

Work performed under the Order and the First Modification was completed between February 2011 and December 2012, and included three phases of subsurface investigation, and decommissioning of the Pipes. Work completed under the Order and the First Modification is summarized in more detail in Sections 3.1 and 3.2, respectively.

Work to be completed under the Second Modification is scheduled to commence in September 2013, concurrent with implementation of the JFEAA Removal Action. Section 3.3 summarizes the tasks to be completed under the Second Modification, including installation of the Shoreline Containment Barrier.

The Shoreline Containment Barrier is intended to serve multiple objectives, including long-term objectives that are not addressed in the Second Modification. Therefore, a Third Modification is anticipated which will entail future removal action(s) to remove PCB-contaminated soil beneath the Jorgensen Forge Outfall Site (Phase 4B).

3.1 ORDER (PHASE 1)

The subject of the Order is the pair of above-described Pipes located along the southern Boeing Plant 2 and the northern JFC Property boundaries. The Pipes were installed in the 1940s around the same time as the southern Boeing Plant 2 and northern Jorgensen Forge Properties underwent development and were originally used to convey storm runoff and surface water from portions of the two properties, the KCIA, and East Marginal Way South into the LDW. The Pipes are 24-inches and 12-inches in¹ diameter and composed of clay and/or corrugated metal (CMP).

The Order initially limited work activities to the clay portion of these Pipes until further investigation could characterize the impacts associated with the CMP portions of the Pipes. A detailed description of the work activities performed under the Order is summarized in the *Jorgensen Forge Outfall Site, Seattle, Washington – Source Control Action – 15-inch and 24-inch Pipes Cleanout Work Plan* (Floyd|Snider 2010). Boeing managed performance of the work in February and March 2011 with oversight by JFC.

The original Order required JFC and Boeing to clean, close, and seal the Pipes and reroute the stormwater to another outfall location. The first investigation completed under the Order (Phase 1 Investigation) was conducted prior to cleaning and sealing the Pipes in order to evaluate whether a release of PCBs from the Pipes into the subsurface had occurred, specifically beneath the corrugated metal section of the Pipes (the western 100 feet of the discharge end of the conveyance system). This evaluation was driven by concerns of potential contaminant releases to soil below holes/gaps in certain sections of the CMP portions of the Pipes that were identified during a previous video reconnaissance survey. Twelve borings (borings T1B1 through T1B4, T2B1 through T2B4, and T3B1, T3B4) were advanced using direct-push probe methods along five transects perpendicular to the shoreline. Soil samples were collected from each boring at depth intervals between ground surface and the top of the Pipes (2 to 5 feet below ground surface [bgs]), near the base of the Pipes (8 to 10 feet bgs) and approximately 2 feet below the fill-native soil interface (13 to 25 feet bgs). Soil samples collected from borings advanced during the Phase 1 Investigation confirmed that PCBs were present in soil in the

¹ The 12-inch Pipe has formerly been referred to as a 15-inch concrete pipe in prior reports and utility maps; however, its true inside diameter is 12 inches (Floyd|Snider 2013).

Jorgensen Forge Outfall Site at elevated concentrations at depths between 2 and 25 feet bgs, in excess of the MTCA cleanup level for unrestricted land uses and TSCA's cleanup level of 1 part per million (ppm) for bulk remediation waste in a high occupancy (for the purposes of this BODR one ppm is considered equivalent to 1 milligrams per kilogram dry weight [mg/kg dw]). Neither vertical nor lateral extents of PCB contamination were defined to this concentration, however. These results prompted EPA, JFC, and Boeing to enter into the first modification of the Order, which required JFC and Boeing to further investigate the nature and vertical and lateral extents of PCB contamination in the vicinity of the Pipes.

3.2 FIRST MODIFICATION (PHASE 2 AND PHASE 3)

Following completion of the Phase 1 Investigation, EPA issued a *Jorgensen Forge Outfall Site First Modification for Administrative Order on Consent for Removal Action* (EPA 2012) that required JFC and Boeing to advance additional Geoprobe borings in the vicinity of the CMP portions of the Pipes to further investigate and bound the lateral and vertical extent of elevated PCB and metals concentrations (referred to as the Phase 2 Investigation) and define the necessary cleanup activities in this area. A detailed description of the First Modification to the AOC work activities is summarized in the *Phase 2 Geoprobe Soil Investigation Work Plan – Jorgensen Forge Outfall Site* (Anchor and Farallon 2012b).

In March and December 2012, Phase 2 and Phase 3 Investigations, respectively, were conducted to supplement Phase 1 data and further characterize the lateral and vertical extents of PCB contamination in soil within the Jorgensen Forge Outfall Site. Twelve borings (borings B-DGP1, B-DGS1, JF-DGP1 through JF-DGP6, JF-DGS1, JF-DGS2, JF-DGS3, and JF-DGT1) were advanced during the Phase 2 Investigation in the vicinity of the corrugated metal pipe using direct-push probe methods. The results of the Phase 2 investigation indicated that concentrations of PCBs exceeding 1 mg/kg dw were present in soil samples collected from three of the borings at the maximum depths explored; the vertical extent of PCB contamination in soil in these locations was not defined. JFC managed performance of the Phase 2 work in March 2012 with oversight by Boeing.

In coordination with EPA and Ecology, JFC and Boeing developed the *Work Plan Addendum for Additional Vertical Polychlorinated Biphenyls Characterization in Soil – Jorgensen Forge Outfall Site* (Anchor and Floyd|Snider 2012) to collect additional subsurface soil total PCBs data co-located at these stations (referred to as the Phase 3 Investigation). Three borings (at locations T1B3, T2B4, and JF-DGP3) were advanced during the December 2012 Phase 3 Investigation using direct-push probe methods in order to vertically define the PCB-contaminated soil previously encountered in the three borings advanced during the Phase 2 Investigation where the deepest depth interval sampled contained total PCBs greater than the 1 mg/kg total PCB screening level. Jorgensen Forge managed performance of the work in December 2012 with oversight by Boeing. A summary of the Phase 3 Investigation results is detailed in the *Results of Additional Soil Geoprobe Vertical Characterization at the Jorgensen Forge Outfall Site* (Anchor 2013a).

3.3 SECOND MODIFICATION (PHASE 4A)

The scope of work required under the Second Modification to the Order includes additional sampling to characterize the extent of PCB contamination within the Jorgensen Forge Outfall Site and the installation of a sheet pile wall along the top of the Lower Duwamish Waterway shoreline bank (Phase 4A), at the northwestern corner of the JFC Property and southwestern corner of the Boeing Plant 2 Property, designated as the Shoreline Containment Barrier Area (Figures 2, 3, 4, and 5). With the exception of

limited grading to establish a level construction staging area and Geoprobe platform, Phase 4A does not provide for completion of any upland removal action.

The objectives of the Phase 4A work described herein are:

- To address a bank material data gap informally referred to as the Blue Wedge (Anchor 2013b).
- To eliminate the potential of migration of PCBs from the uplands side of the Shoreline Containment Area to the LDW.
- To install infrastructure necessary for the removal of PCB-contaminated shoreline bank material, should it be found to occur, directly west of the sheet pile wall within the Blue Wedge—the scope of which is described in the BODR for the JFEAA Removal Action.

Section 5.0 describes the work elements that will be implemented to meet the terms and conditions of the Order.

4.0 NATURE AND EXTENT OF PCB CONTAMINATION

The results of the Phase 1, 2, and 3 Investigations have defined the north, south, and east lateral extents of PCB-contaminated soil greater than 1 mg/kg. The western lateral extent of PCB contamination in the Blue Wedge area has yet to be defined due to the LDW bank and shoreline, which are steeper than a slope of 1 horizontal distance to 1 vertical rise (1H:1V). Apart from this area, the known lateral extent of soil containing PCBs at concentrations equal to or greater than 1 mg/kg dw is generally bound in a 30 by 70 feet area (Anchor 2013a). The vertical extent of PCB contamination ranges to depths of approximately 32 feet bgs (approximate Elevation -13 feet mean lower low water [MLLW]).

Eight soil samples collected during the three investigations contained concentrations of PCBs exceeding 50 mg/kg dw, the concentration at which bulk PCB remediation wastes must be disposed of as hazardous waste, pursuant to TSCA regulations, Sections 761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(v)(A) of Title 40 of the Code of Federal Regulations. The known extent of soil containing PCBs at concentrations equal to or greater than 50 mg/kg dw is generally bound in a 20- by 30-foot area at depths between 7 and 25 feet bgs.

5.0 MEANS AND METHODS

In order to meet the Phase 4A objectives listed in Section 3.3, JFC and Boeing will complete the following tasks:

- Task 1—Site preparation activities including professional survey, construction layout, utility locates, installation of silt fencing, and installation of temporary security fencing.
- Task 2—Construction of a level staging area in preparation for advancement of angle borings via push-probe drill-rig.
- Task 3—Advancement of angle borings to collect deep bank material samples from the Blue Wedge for laboratory analysis.
- Task 4—Data evaluation, including data validation, waste characterization, and geometric evaluation of the angle boring data.

- Task 5—Engineering design and installation of the Shoreline Containment Barrier and supports; Coordination with the JFEAA Removal Action project access requirements and construction logistics.
- Task 6—Manage construction- and investigation-derived wastes.

The means and methods proposed to accomplish the Phase 4A objectives are described in Sections 5.1 through 5.6.

5.1 SITE PREPARATION ACTIVITIES

Site preparation activities shall include installation of silt fencing, one-call utility notifications for the JFC and Boeing properties, and a private utility locate to identify and mark conductible utilities within the footprint of the Phase 4A Shoreline Containment Barrier. Furthermore, at least 80 feet of existing chain-link fencing that secures the JFC Property and Boeing Plant 2 Property must be demolished in order to access the footprint of the Phase 4A work area; temporary security fencing shall be installed around the work area to ensure continuity of security at both properties.

A professional survey shall be performed to locate horizontal and vertical datums, locate certain survey control points shared with the JFEAA Removal Action project (Control Point Nos. 118 and 119), the location of the prior angle boring at location T2B4, and to mark limits of excavation of the angle boring staging area.

5.2 CONSTRUCTION OF DRILL RIG STAGING AREA

Limited access conditions characterized by the steep bank and shoreline of the western margin of the Jorgensen Forge Outfall Site have obstructed the collection and laboratory analysis of bank material samples from the Blue Wedge. The existing top-of-bank is situated at approximate Elevation +19 feet MLLW. As shown on Figure 4, a drill rig staging area established at no higher than Elevation +15 feet MLLW will facilitate collection of soil samples from the Blue Wedge by means of up to four angled borings as shown in plan view on Figure 3. Assuming a safe working footprint of 12 feet wide by 30 feet long for a standard push-probe drill rig, the maximum limits of excavation for the proposed Drill Rig Staging Area are shown on Figure 3. The perimeter embankments shall be no steeper than 1H:1V except where they abut the existing Boeing sheet pile wall. In the event that the subgrade conditions at Elevation +15 feet MLLW are deemed insufficient for traction and/or support of the drill rig, an additional 6 to 12 inches shall be excavated and replaced with angular gravel, fine ballast, or spalls. Otherwise at least 2 inches of angular gravel may be placed on the Drill Rig Staging Area as a Best Management Practice intended to protect the subgrade from rainfall, foot- and equipment-traffic. Overburden soil excavated during Task 2 shall be managed in stockpiles in accordance with the procedures described in Section 5.6.

5.3 ANGLE BORINGS

Up to four angled borings will be advanced as part of Phase 4A in order to characterize soil west of the Property Line Outfall Site, at locations deeper and farther west than previously investigated and within the volume of bank material referred to as the Blue Wedge. Depending on results, the Blue Wedge is subject to removal action in connection with completion of the adjacent JFEAA Removal Action. The following subsections describe the methods for boring and collection of soil and bank material samples for laboratory analysis, characterization, and waste profiling. The angle-borings will be advanced using a

push-probe drill rig operated by the state-licensed well-drilling firm Cascade Drilling, LLP of Woodinville, Washington.

5.3.1 Boring Advancement

The proposed borings (JFOS2-BH01 through JFOS2-BH04) will be advanced using direct-push probe methods at a 30° angle off vertical to maximum target depths between 25 and 30 feet bgs (maximum Elevation -10 feet MLLW), for total boring lengths of approximately 30 to 35 feet. Each boring will be advanced in 5-foot segments. The proposed angle-boring locations are depicted on Figure 3 and assume ideal target azimuths of North 90° West and North 120° West, in order to intersect the Blue Wedge. A field geologist will take digital photographs of each sample interval and observe and log the subsurface conditions; perform field-screening procedures, including qualitative descriptions of visual and/or olfactory indications of contamination; and containerize samples for potential laboratory analysis. Soil and bank material samples will be classified in accordance with American Society for Testing and Materials Designation D2488, Standard Practice for the Description and Identification of Soils (Visual-Manual Procedure). The geologist will record the material description, the Unified Soil Classification System group symbol, visual-olfactory evidence of contamination noted in the material samples, and the fill-native soil interface, if encountered.

5.3.2 Sampling and Analysis

Soil/bank material samples will be collected for potential analysis in 2-foot intervals beginning at the lateral and vertical extent of the proposed adjacent sheet pile wall (approximately -8 feet MLLW). Soil at shallower depths has already been sufficiently characterized in this area. Soil/bank material samples will be collected directly from the direct-push probe sampler using stainless steel sampling tools.

Soil/bank material samples will be collected from the borings in accordance with the SAP, as described in Section 9.0 and modified in Appendix B. Soil samples collected from the borings will be transferred directly into laboratory-prepared sample containers and labeled using a unique sample number, as well as the sample date, time sampled, and project name, logged on a chain of custody form and transported to Friedman & Bruya, Inc. (F&B), a Washington State- and EPA Contract Laboratory Program-accredited environmental laboratory for potential laboratory analysis following the two-tier approach described in Section 5.4.

Field equipment blank and field duplicates will be collected in accordance with the QAPP (Section 9.0).

5.4 DATA EVALUATION AND TRANSMITTAL

The location of each angle boring shall be surveyed and the as-built angle and azimuth of each angle boring shall be evaluated to confirm the angle boring intersection of the Blue Wedge and to verify which soil/bank material sample interval best intersects the Blue Wedge.

Soil/bank material samples will be submitted for expedited PCB laboratory analysis using a two-tier approach. The first tier will include analyzing the upper 10 feet of the Blue Wedge material from each completed boring location for PCBs, by EPA Method 8082, under an expedited timeline. If field observations indicate contamination at deeper sample intervals, this approach may be modified. The laboratory analytical results of the first tier soil samples will determine whether a second tier of analyses need to be performed on soil collected from sample intervals deeper than the upper ten feet of the Blue

Wedge. Soil analyses will not be performed on samples where 4 consecutive feet of soil or bank materials contain PCB concentrations below 1 mg/kg dw.

The preliminary results of laboratory analysis and geometric evaluation will be submitted to EPA under cover of a letter-report with supporting graphics for EPA concurrence, planning, distribution, and coordination of final design for removal of bank material under the west-adjacent JFEAA Removal Action and north-adjacent Boeing Southwest Bank Removal Action projects. Final results following QA/QC review of the data will be presented in the completion report.

5.5 SHORELINE CONTAINMENT BARRIER

The Owners propose the installation of a top-of-shoreline bank containment barrier at an elevation no lower than 12 feet mean higher high water (MHHW) to eliminate the potential for contaminant migration of elevated PCBs and metals concentrations from soil to the LDW environment, allow for the removal of contaminated shoreline bank materials directly west of the barrier scheduled to initiate in September 2013, and allow for any necessary future removal of impacted soils to the east of the barrier. This section provides a description of this proposed Shoreline Containment Barrier (Section 5.5.1) and its installation (Section 5.5.2).

5.5.1 Description of Shoreline Containment Barrier

A sheet pile wall shoring system is proposed along the alignment shown in Figure 5. The final type of sheet pile wall shoring system will be determined and designed by the design engineer. The shoring design calculations, drawings, and details will be prepared and stamped by a professional structural engineer registered in the State of Washington. The sheet pile/shoring design calculations and drawings must demonstrate the following:

- Integrity of the design and conformance to the design criteria, taking into consideration all anticipated loads, sequences, and conditions during the various construction, excavation, and removal stages.
- Detailed drawings showing pertinent dimensions, bracing, spacing, and layout of components of the shoring system.
- Anticipated, allowable wall deflections.
- Minimal separation from existing Boeing Plant 2 sheet pile wall to limit groundwater seepage at those junctures.

5.5.2 Installation

The Shoreline Containment Barrier shall be installed by a state-licensed contractor experienced with the installation of sheet pile walls. Because the Shoreline Containment Wall would otherwise obstruct and preclude the advancement of angle borings described in Section 5.3, installation of the Shoreline Containment Barrier must be scheduled after completion of the angle boring activities. The connections, if any, between the new sheet pile wall system and the existing Boeing sheet pile wall is subject to further design coordination by the Owners. The structure shall be designed to withstand a series of unbalanced excavations on one or both sides of each wall. The scope of structural reinforcement alternatives such as tie-backs, walers and cross-bracing, and cantilevering, are subject to further cost-benefit analysis by the Owners within the context of the waste minimization objectives of the EPA Green Remediation Program

and Section 10.0 of this BODR. The top of the Shoreline Containment Barrier shall be at Elevation 17 feet MLLW (Anchor 2013b) to prevent flooding from high river stages.

5.6 MANAGEMENT OF CONSTRUCTION- AND INVESTIGATION-DERIVED WASTES

PCB-contaminated soils will be excavated from the JFC Property and the Boeing Property during one or more tasks associated with completion of Phase 4A. Furthermore, construction activities are expected to generate small quantities of decontamination water. This BODR anticipates the following categories of waste streams generated from Tasks 2, 3 and 5:

- Task 2 JFC Property—Soil excavated from the JFC Property during Task 2 (construction of the angle-boring staging area) will be stockpiled for re-use as interim backfill on the JFC side within the footprint of the Shoreline Containment Barrier. These soils, at maximum, may contain up to 13.5 mg/kg PCBs based on results from the location of boring JF-DGP2 (Anchor 2013a).
- Task 3 JFC Property—Advancement of the angle borings is expected to generate less than two cubic feet of excess core material; preliminary information regarding anticipated PCB concentrations is not available. Therefore, these materials will be contained in Department of Transportation-approved 55-gallon drums for profiling and disposal at a permitted facility, pending receipt and analysis of analytical results.
- Task 5 JFC Property—Drill cuttings and/or trench spoils generated from the JFC Property during Task 5 potentially contain up to 330 mg/kg PCBs at the location of Boring JF-DGP3 (Anchor 2013). These soils either will be contained in Department of Transportation-approved 55-gallon drums for profiling and disposal at a permitted facility, pending receipt and analysis of analytical results, or stockpiled for potential re-use as interim backfill within the footprint of the Shoreline Containment Barrier.
- Task 5 Boeing Property—Drill cuttings and/or trench spoils generated from the Boeing Property during Tasks 2 and 5 either will be contained in Department of Transportation-approved 55-gallon drums for profiling and disposal at a permitted facility, pending receipt and analysis of analytical results, or stockpiled for potential reuse as interim backfill within the footprint of the Shoreline Containment Barrier.
- Decontamination water generated during completion of Tasks 2, 3, and 5 shall be temporarily contained in Department of Transportation-approved 55-gallon drums, sampled for PCBs and Toxicity characteristic leaching procedure Priority Pollutant Metals for waste profiling purposes. The containerized water and soil will be disposed offsite to the appropriate permitted disposal facility after receipt of the results and acceptance of the laboratory analytical data.

6.0 PERFORMANCE CRITERIA

Other than the generation and disposal of overburden soil, no removal action at the JFC Property or Boeing Property is required under the Second Modification to the Order – Phase 4A. The following performance criteria will be used to evaluate successful completion of the work described in this BODR:

- Successful retrieval of at least two core samples from within the bank material known as the Blue Wedge.
- Conformance of the as-built alignment of the Shoreline Containment Barrier to the designed alignment and depth to allow the anticipated JFEAA removal action and later Phase 4B removal action to occur.

- Successful completion of the west-adjacent JFEAA Removal Action.
- Timely characterization, waste profiling, and documentation of proper disposal of construction- and investigation-derived wastes.

7.0 ANTICIPATED TIMELINE AND KEY MILESTONES

In accordance with Condition 3 of the Second Modification, the following activities described in the BODR shall be coordinated with the Earle M. Jorgensen Company (EMJ) Removal Action (JFEAA Removal Action), Boeing Plant 2 Duwamish Sediment Other Area and South West Bank Corrective Measure.

MILESTONE	TIMELINE
▪ EPA Approval of the BODR	14 Days
▪ Complete Site Preparation	5 Days after EPA Approval of BODR
▪ Complete Subsurface Sampling	2 Days following Site Preparation
▪ Expedited Data Evaluation	28 Days following Subsurface Sampling
▪ Complete Installation of Sheet Pile Wall	14 Days following Subsurface Sampling
▪ Complete Waste Management	45 Days following Installation of Sheet Pile Wall
▪ Submit Removal Action Report to EPA	90 Days following Installation of Sheet Pile Wall

The Site Preparation tasks have been completed.

8.0 PROJECT ORGANIZATION, RESPONSIBILITIES, AND LEAD PERSONNEL QUALIFICATIONS

The following subsections describe the roles and responsibilities of lead personnel, as well as their qualifications. The scope of work described in this BODR is related to other removal actions proceeding in series or in parallel under separate regulatory jurisdictions and administrative orders. The following subsections introduce agencies and case managers with jurisdiction over Phase 4A and related removal actions, property owner representatives, and owner's environmental consultants. A flow chart of the project organization is provided as Appendix A.

8.1 AGENCY LEAD PERSONNEL

The Shoreline Containment Barrier/Property Line Outfall project is subject to EPA jurisdiction and CERCLA regulatory framework. Jennifer Edwards is EPA Region 10's Remedial Project Manager overseeing the completion of investigation and removal actions proceeding under the Second Modification.

The west-adjacent JFEAA Removal Action is subject to EPA jurisdiction and CERCLA regulatory framework. Rebecca Chu is EPA Region 10's Remedial Project Manager overseeing the completion of LDW investigation and removal actions proceeding under CERCLA.

On-going investigation and removal actions at Boeing Plant 2, including the north-adjacent Boeing RCRA Corrective Action project, are subject to EPA jurisdiction under RCRA. Holly Arrigoni is EPA Region 10's Remedial Project Manager overseeing the completion of investigation and removal actions proceeding at Boeing Plant 2 under a RCRA Order.

Maureen Sanchez is Washington Department of Ecology’s case manager overseeing upland removal actions recently completed by JFC under Agreed Order No. DE 4127, and completion of the Remedial Investigation and Feasibility Study for the upland portions of the Jorgensen Forge Property under a pending Agreed Order between Ecology and JFC.

8.2 JFC LEAD PERSONNEL

JFC, the current owner of the Jorgensen Forge Property, is responsible for implementation of this BODR, coordination with Boeing, and joint fulfillment of the terms and conditions of the Second Modification between JFC, Boeing, and EPA. JFC’s interests are represented by the following personnel:

- Ms. Sheri Bozic is JFC’s Environmental Compliance Director.
- Ms. Deborah Gardner, LEG, LHG, MS, of SoundEarth Strategies, Inc. is a state-licensed engineering geologist and hydrogeologist. Ms. Gardner is SoundEarth’s project manager for upland remedial investigation and removal activities performed at the Jorgensen Forge Property.

8.3 BOEING LEAD PERSONNEL

Boeing, the current owner of the Plant 2 property, is jointly responsible with JFC for the fulfillment of the terms and conditions of the Second Modification. Boeing’s interests are represented by the following personnel:

- Mr. William Ernst, EO&T, EHS, of Boeing is the manager for RCRA Correction Actions activities conducted at Uplands Areas of Plant 2.
- Mr. Thomas Colligan, LHG, of Floyd|Snider is the technical consultant for Boeing for this project.

8.4 EMJ LEAD PERSONNEL

EMJ, the former owner of the Jorgensen Forge Property, is responsible for implementation and completion of the JFEAA Removal Action. JFC and Boeing shall coordinate activities completed under this BODR with the following personnel:

- Ms. Amy Essig Desai, principal scientist of Farallon Consulting, LLC, is EMJ’s Project Coordinator responsible for coordinating activities resulting from the 2003 Administrative Order on Consent between EMJ and EPA.
- Mr. Ryan Barth, P.E., of AQEA, is a state-licensed civil engineer and AQEA’s senior project manager overseeing design and implementation of the JFEAA Removal Action.

9.0 DOCUMENTATION AND REPORTING REQUIREMENTS

Condition 3 of the Second Modification, requires the preparation of a Removal Action Report within 90 days of completion of Phase 4A. The scope of work required under the Jorgensen Forge Outfall Site – Phase 4A does not constitute a removal action, other than incidental grading of overburden soils related to site preparation for the angle borings and installation of the Shoreline Containment Barrier. Therefore, the Removal Action Report shall focus on the analytical and geometric interpretation of the angle boring data obtained through completion of Tasks 3 and 4, coordination with and facilitation of the west-adjacent JFEAA Removal Action, as-built records of the Shoreline Containment Barrier, and

description of variances, if any, from the design. Receipts for disposal of investigation- and construction-derived waste soil and waste water shall be attached to the Removal Action Report.

In addition to the preparation of a formal Removal Action Report, project documentation and reporting requirements shall be performed in accordance with the Sampling and Analysis Plan (SAP), Appendix I of the JFEAA BODR, including the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) attached to the SAP, to the extent that the SAP, QAPP, and FSP apply to upland activities. SoundEarth has identified several modifications and personnel substitutions to the JFEAA SAP, QAPP, and FSP, which apply to the implementation of Phase 4A. These modifications are itemized in Appendix B.

Field activities shall be performed in accordance with the Health and Safety Plan (HASP), Appendix K of the JFEAA BODR, to the extent that they apply to upland activities. SoundEarth has identified several modifications and personnel substitutions to the JFEAA HASP; these modifications are itemized in Appendix C of this BODR.

9.1 SAMPLING AND ANALYSIS AND QUALITY ASSURANCE PROJECT PLANS

SoundEarth will proceed with oversight and documentation in accordance with the Sampling and Analysis Plan (SAP), Appendix I of the JFEAA BODR, prepared by Anchor QEA, LLC (Anchor) in August 2013, to the extent practicable for the uplands work activities described herein as the Phase 4 Investigation. The JFEAA SAP outlines requirements for the implementation of both upland and in-water construction activities for the JFEAA and has been reviewed and approved by EPA for implementation. Attachments to the JFEAA SAP include the QAPP and FSP.

SoundEarth has identified several modifications and personnel substitutions to the JFEAA SAP, which apply to Phase 4A, as documented by SoundEarth on behalf of JFC. These are presented in Appendix B.

9.2 HEALTH AND SAFETY PLAN (HASP)

SoundEarth will proceed with oversight and documentation in accordance with the HASP, Appendix K of the JFEAA BODR, prepared by Anchor in August 2013, to the extent practicable for the uplands work activities described herein as Phase 4A. The JFEAA HASP outlines requirements for the implementation of both upland and in-water construction activities for the JFEAA and has been reviewed and approved by EPA for implementation.

The following modifications to the JFEAA HASP shall apply to implementation of the field activities described in this BODR:

Facility Contact:	Sheri Bozic	(O: 206.965.1352; C: 206.920.9653)
Corporate Health and Safety Administrator:	Chris Carter	(O: 206.436.5905; C: 206.618.0306)
Principal-in-Charge:	Ryan Bixby	(O: 206.306.1900; C: 206.818.0669)
Project Manager:	Deborah Gardner	(O: 206.436.5913; C: 206.351.2412)
QA/QC Officer:	Audrey Hackett	(O: 206.436.5939; C: 206.331.1835)
Field Lead/Site Safety Officer:	Chris Cass	(O: 206.436.5953; C: 425.765.4490)

SoundEarth shall substitute standard SoundEarth field forms and field submittals (e.g. chain of custody, HASP acknowledgement, etc.) that are equivalent to the forms proposed by AQEA and which apply to the practical implementation of the requirements of the BODR in the upland environment.

A complete list of the modifications and adaptations of the JFEAA HASP to upland activities performed under Phase 4A on behalf of JFC and Boeing are presented in Appendix B.

10.0 GREEN REMEDIATION STRATEGIES

The work described in this BODR shall be completed in accordance with the Green Remediation Strategy specifications described in Appendix J of the JFEAA BODR, to the extent that the specifications apply to upland activities, construction equipment, and transportation routes. SoundEarth has identified the following modifications and clarifications to the existing Green Remediation Strategy specifications for application to the upland activities described in this BODR:

- No in-water work will be performed in connection with this BODR; therefore, references to sediment, dredge material, and marine equipment do not apply.
- The Owners shall inform contractors of the policy and project requirements and require submittals documenting a contractor's compliance with the requirements.
- In the event that a contractor is not able to meet the requirements, then the Owners shall require that the contractor provide a statement explaining why the contractor is not able to meet a requirement (e.g., if a manufacturer's specification that prohibits the use of - or invalidates warranty - if the equipment is fueled using biofuel products; if biofuels clog injectors or dissolve gaskets; or if the task requires specialty equipment that is not readily available with the Tier 3/Tier 4 certification).
- Opportunities for upland waste minimization include:
 - The use of push-probe drilling technology to minimize the volume of waste drill cuttings and decontamination water.
 - Segregation of waste streams to the degree that space and time constraints allow.
 - The use of tiebacks instead of structural bracing, trenching, and backfilling, if engineering design deems technically feasible and structurally sound.
 - Re-use and re-compaction of excavated soil as backfill if the area is slated for multiple cycles of excavation and backfill, in lieu of importing clean backfill and hauling off-Site for disposal for each cycle of excavation.
 - Re-use and re-compaction of excavated soil as backfill if the soil quality meets the project remedial objectives.

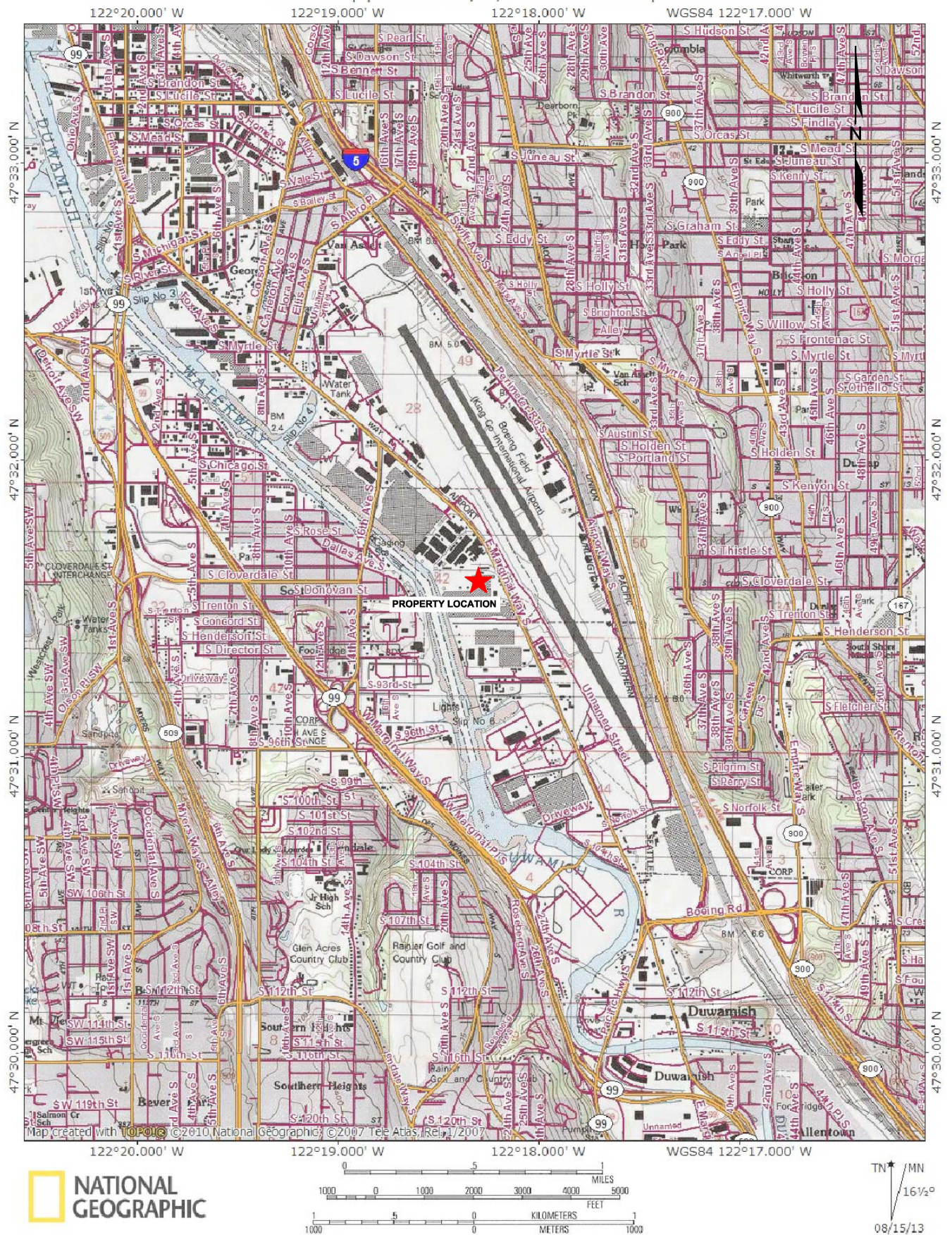
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FIGURES

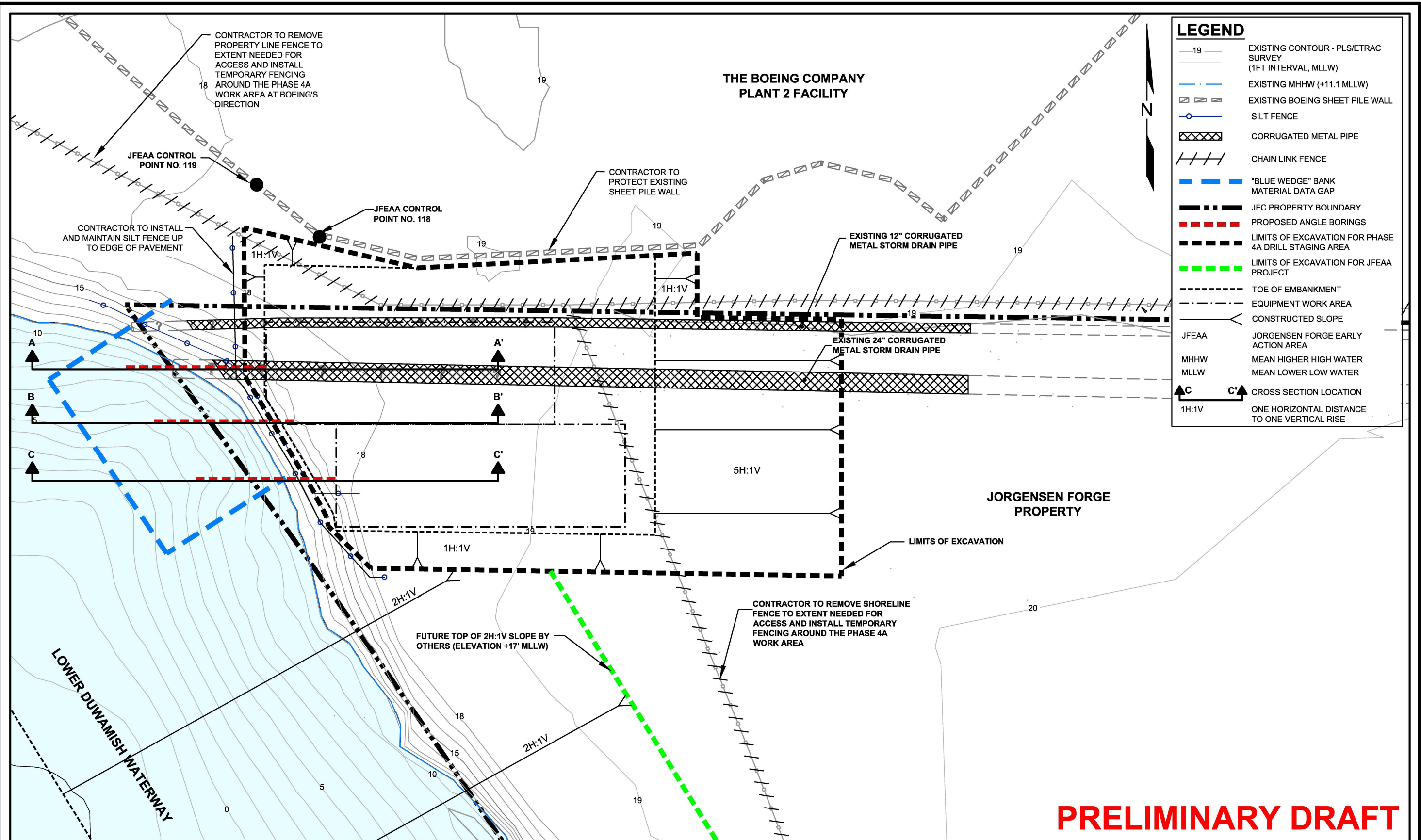
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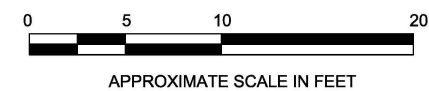
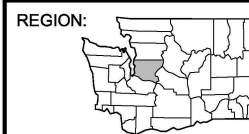
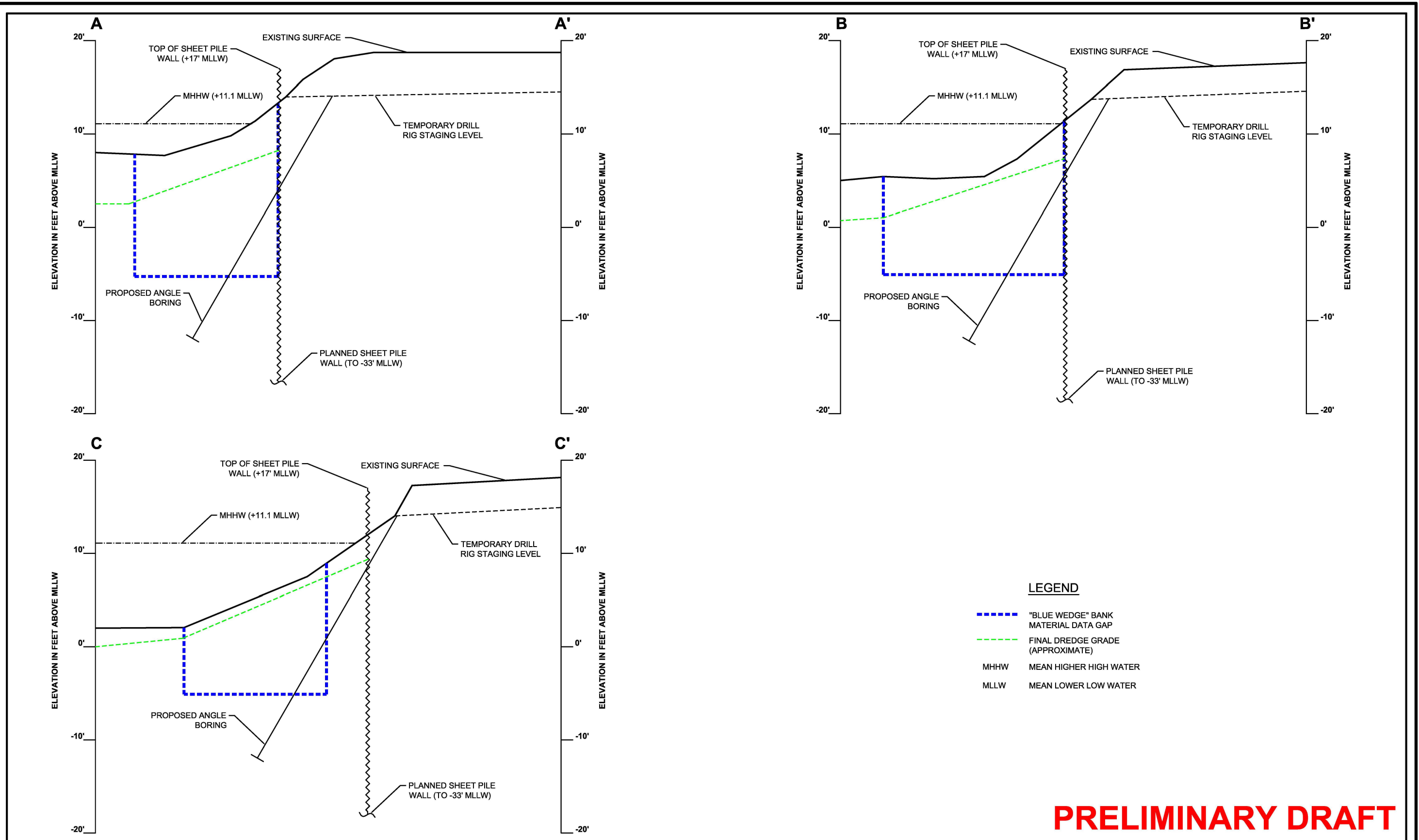


FIGURE 3
GRADING PLAN AND LIMITS OF
EXCAVATION FOR ANGLE BORINGS

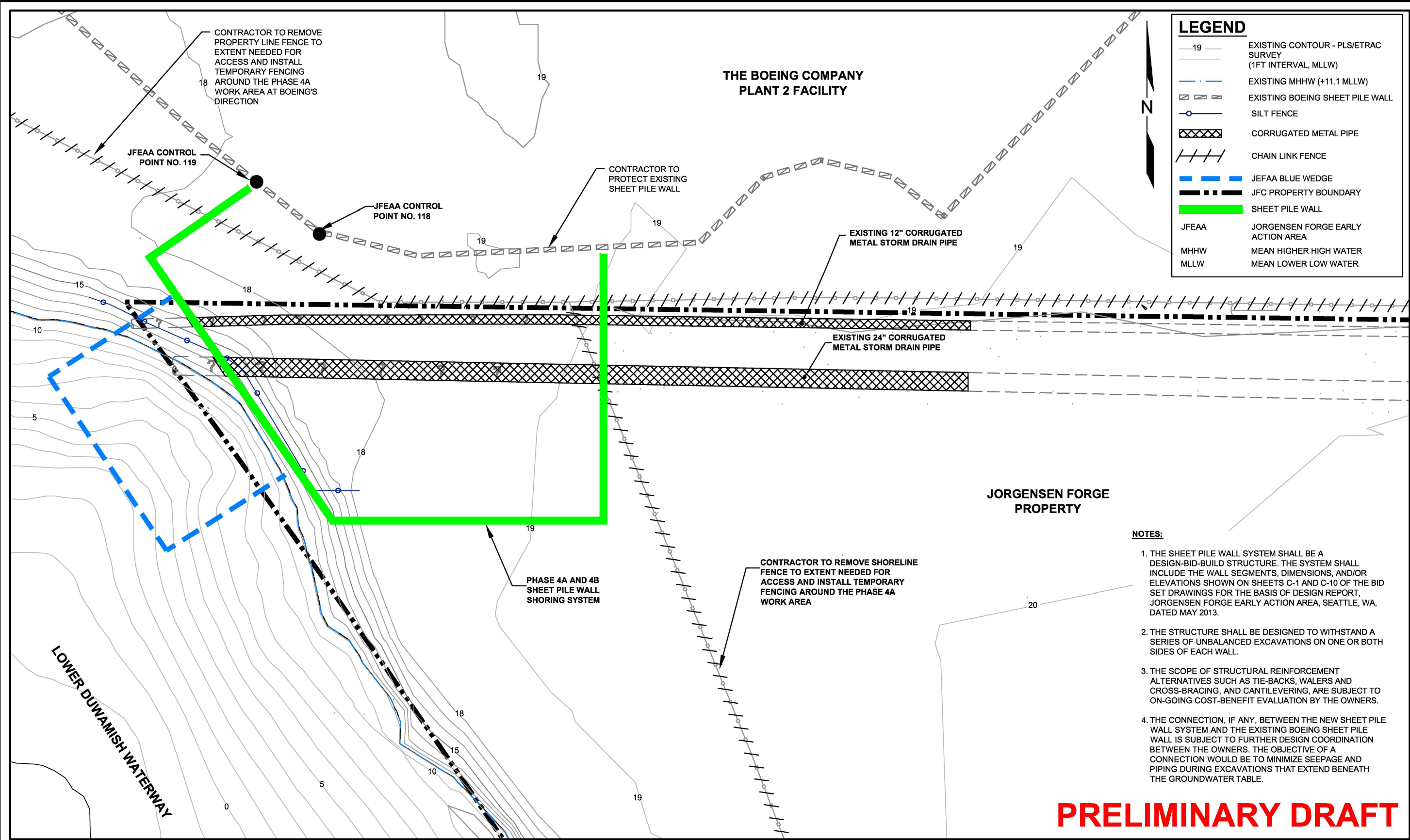
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 www.soundearthinc.com	DATE: 09/05/13	PROJECT NAME: JORGENSEN FORGE OUTFALL SITE		 APPROXIMATE SCALE IN FEET	FIGURE 4 CROSS SECTION
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PRELIMINARY DRAFT



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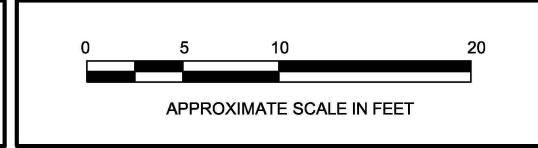
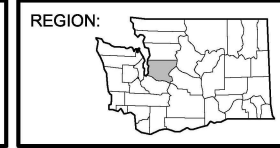


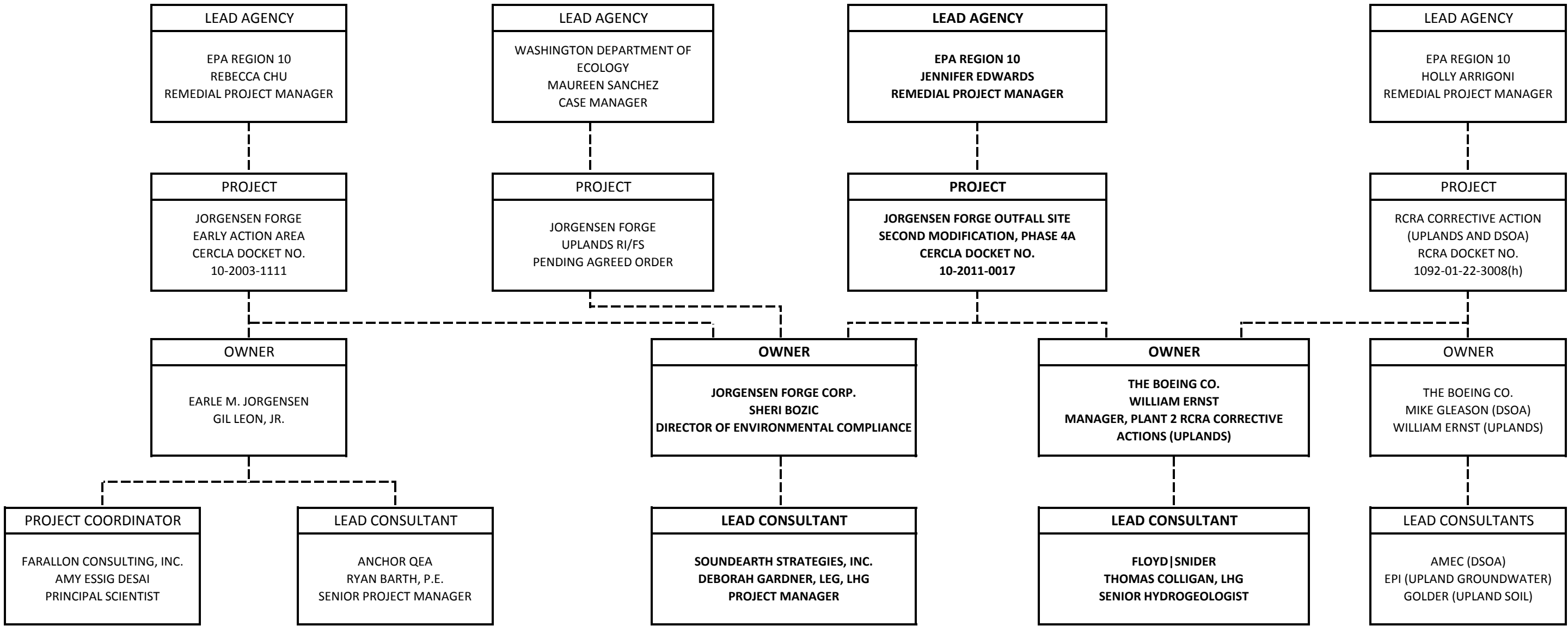
FIGURE 5
SHEET PILE SHORING PLAN

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APPENDIX A
PROJECT ORGANIZATION, RESPONSIBILITIES, AND LEAD
PERSONNEL



PROJECT ORGANIZATION, RESPONSIBILITIES, AND LEAD PERSONNEL
JORGENSEN FORGE OUTFALL SITE - PHASE 4A/SHORELINE CONTAINMENT BARRIER
JORGENSEN FORGE CORPORATION AND THE BOEING COMPANY
CERCLA DOCKET NO. 10-2011-0017



NOTES:
AMEC = AMEC, INC., KIRKLAND, WA
EPI = ENVIRONMENTAL PARTNERS, INC., ISSAQUAH, WA
DSOA = DUWAMISH SEDIMENT OTHER AREA
GOLDER = GOLDER ASSOCIATES, INC., REDMOND, WA

APPENDIX B

MODIFICATIONS TO SAP AND QAPP

APPENDIX B MODIFICATIONS TO THE SAP/QAPP

SoundEarth has identified several modifications and personnel substitutions to the JFEAA SAP, which apply to Phase 4A, as documented by SoundEarth on behalf of JFC. Universal modifications to the JFEAA SAP include the following:

- The proposed scope of work includes soil characterization and removal within the Jorgensen Forge Outfall Site, as outlined in the statement of work for the Administrative Order on Consent for Removal Action and its first and second modifications (CERCLA Docket No. 10-2011-0017).
- SoundEarth replaces Anchor as the consultant.
- F&B replaces Analytical Resources Inc. as the laboratory.
- No surface water sampling or monitoring is proposed in Phase 4A.
- Soil sampling is proposed instead of sediment sampling during Phase 4A, and will only be analyzed for PCBs. The laboratory Quality Control/Quality Assurance procedures; laboratory reporting limits; quantitative goals; and analytical method container, holding time, and preservation requirements remain the same for soils as those presented in the JFEAA SAP for sediments.

A more detailed description of the modifications necessary to meet the performance criteria for Phase 4A are presented below and are organized by section of the Phase 2 SAP:

Attachment 1: QAPP

1.1 Management

- The EPA Manager is Jennifer Edwards.
- The SoundEarth Principal-in-charge is Ryan Bixby.
- The SoundEarth Project Manager is Dee Gardner.

1.2 Field Coordinator

- The Field Coordinator is David Mendel.

1.3 Quality Assurance Manager

- The Quality Assurance Manager is Audrey Hackett.

1.4 Data Manager

- The Data Manager is Jennifer Cyr.

1.5 Laboratory Manager

- The Laboratory Manager is Michael Erdahl, of F&BI.
- No outside consultant will be used for data validation. As specified in F&BI's *Laboratory Quality Assurance Manual*, the laboratory will perform initial data reduction, evaluation, and reporting.

3 Project/Task Description

- Phase 4A is the proposed work to be completed, and is discussed in detail in Section 5.0 of this report. No short- or long-term monitoring of surface water or sediment is included in the work to be performed.

4.1 Measurement Quality Objectives for Chemical Data

- The reporting limit goals for sediment/soil shall remain the same, but surface water quality parameters do not apply. Additionally, concentrations of PCBs in soil samples collected during the Phase 4A will be compared to 1 mg/kg dw for MTCA Method A Cleanup Levels for Unrestricted Land Uses and TSCA bulk PCB remediation waste level of 50 mg/kg dw for compliance and disposal purposes, respectively.

6 Documents and Records

- F&BI will be required to provide laboratory reports.

7 Sampling Process Design

- None of the sampling process design included in the JFEAA SAP applies to Phase 4A work element. Soil/bank material samples will be collected during Phase 4A drilling activities in order to characterize PCB concentrations within the Blue Wedge. No long-term monitoring is proposed under the scope of work. A detailed description of the soil/bank material sampling is provided in Section 5.3 of this report.

8 Sampling Methods

- Soil/bank material is the only medium proposed to be sampled during Phase 4A. The methods for sampling soil/bank material are described in detail in Section 5.3.2 of this report.

9 Sample Handling and Custody

- F&BI will not generate a Level IV Data Report. A Data Validation Section will be included in the Removal Action Completion Report, which summarizes any data validation issues encountered through the data validation process and in the laboratory report(s) QA/QC summaries.

16.2 Data Reporting

- The EDD file supplied by F&BI will be used to create data tables in excel. No EQuIS database will be used.

16.4 Laboratory Turnaround time

- Samples submitted for the first tier of PCB analysis will be expedited for sample analysis (three-day turnaround time) in order to evaluate whether any second tier analysis should be performed. Second tier analyses will be performed under a similar turnaround.

16.5 Archival/Retention Requirements

- No archival samples will be stored.

18 Reports

- Phase 4A – within 90 days following completion of all work required under the Second Modification of the Order, a Removal Action Completion Report will be submitted to the EPA. No other reports are proposed.

Attachment 2: Field Sampling Plan (FSP)

1 Introduction and Scope of Document

- The removal action consists of the advancement of angle borings to characterize contamination of soil within the Blue Wedge and the installation of a shoreline containment barrier.
- The FSP for Phase 4A does not include visual monitoring of the shoreline bank and backfill areas or surface water and sediment sampling
- Task-specific field work plans will be prepared for the field personnel conducting the activities.

2 Visual Monitoring

- Visual monitoring is not included in this scope of work

3 Soil Monitoring

- Soil/bank material is the only media to be sampled. (Remove Sections 3.1.1, 3.1.2, 3.2, and 3.3)

3.4 Subsurface Sediment Sample Collection

- Soil samples will be collected from direct-push probe borings instead of mudmole cores.

3.4.1 Sampling Procedure

- Section 5.3 of this report describes in detail the method of boring advancement and the soil sampling procedures.

3.4.1.1 Sample Acceptance Criteria

- A minimum of one sample in a contiguous 4-foot section of vertical boring depth must be achieved in order to meet sample acceptance criteria. If this is not achieved, up to three additional borings will be located within 3 feet of the first attempt, subject to accessibility and time constraints.

3.4.2 Core Processing Procedure

- Continuous soil cores will be collected using the procedures outlined in Section 5.3.1 of this report.
- Cores will be logged with the observations listed in Section 5.3.1 of this report in the stepwise fashion outlined.
- Discrete soil samples from depth intervals will be placed directly into clean laboratory containers.

3.5.1.1 Soil Sampling Procedure

- Soil samples will be collected using push-probe drill rig technology.

3.5.1.2 Processing Procedure

- Soil samples will be placed directly into clean laboratory containers, not homogenized in a mixing container.

3.6 Decontamination Procedures

- Pre-wash rinse and post-wash rinses will be tap and distilled or deionized water, respectively. No site water will be used.

3.7 Sample Identification Numbers

- Section 3.7.1: Surface Water does not apply.

3.7.2 Soil Sample Identification Numbers

- The first set of characters will be “JF” to identify the samples as Jorgensen Forge Samples, followed by the second character that indicates it is a boring (i.e. “B”), the third set of characters indicate the boring number (e.g. “01”), and the fourth character indicates the cored depth interval where the sample was collected (e.g. “04-08”). For example, the sample collected from the proposed boring B-X at a depth interval from 4 to 8 feet of cored depth under Phase 4A will be identified by the following “JF-B01-04-08.”

3.7.3 Sample Collection Schedule

- Soil samples are scheduled to be collected during the advancement of angled borings through the Blue Wedge, as indicated in Section 7.0 of this report.

4.1 Documentation

- SoundEarth proposes to substitute standard SoundEarth field forms and field submittals (e.g. chain of custody, HASP acknowledgement, etc.) that are equivalent to the forms proposed by Anchor and which apply to the practical implementation of the requirements of the BODR in the upland environment. We do not propose to utilize Sediment Core Collection or Visual Observation Logs, or the Site map Visual Monitoring Forms that were attached to the JFEAA SAP FSP.
- Sections 4.1.2.3: Visual Monitoring Documentation and 4.1.2.4: Surface Water Collection of the JFEAA SAP do not apply.

6 Waste Management

- Construction- and Investigation-Derived Waste will be handled as outlined in Section 5.6 of This Report.

APPENDIX C

MODIFICATIONS TO HASP

APPENDIX C MODIFICATIONS TO THE HASP

SoundEarth will proceed with implementing the health and safety procedures outlined in the Health and Safety Plan (HASP), Appendix K of the JFEAA BODR, prepared by Anchor in August 2013, to the extent practicable for the uplands work activities described herein as the Phase 4A. The JFEAA HASP describes the health and safety procedures that must be followed when conducting both upland and in-water construction activities for the JFEAA and has been reviewed and approved by EPA for implementation.

SoundEarth has identified several modifications and personnel substitutions to the JFEAA HASP, which apply to Phase 4A, as documented by SoundEarth on behalf of JFC. Universal modifications to the JFEAA HASP include the following:

- The proposed scope of work includes soil characterization and removal within the Outfall Site, as outlined in the statement of work for the Administrative Order on Consent for Removal Action and its first and second modifications (CERCLA Docket No. 10-2011-0017).
- SoundEarth replaces Anchor as the consultant.
- No surface water sampling or monitoring is proposed in Phase 4A.
- SoundEarth and its subcontractors will conduct uplands work that complies, as applicable, with the minimum standards described in Chapter 155 of Title 296 of the Washington Administrative Code, Safety Standards for Construction Work, including Section 235, Working Over or Adjacent to Water.
- The JFEAA HASP does not include drilling activities. During Phase 4A drilling Activities, SoundEarth will conduct work in accordance with its corporate health and safety plan, which covers drilling health and safety in accordance with WAC 296.

A more detailed description of the modifications necessary to meet the protection criteria for Phase 4A are presented below and are organized by section of the JFEAA HASP:

Table A – Site Emergency Form and Emergency Phone Numbers; Key Safety Personnel

The following personnel substitutions have been identified:

- Facility Contact: Sheri Bozic (O: 206.965.1352; C: 206.920.9653)
- Project Manager: Dee Gardner (O: 206.436.5913; C: 206.351.2412)
- Field Lead/Site Safety Officer: David Mendel (O: 206.436.5907; C: 719.510.8595)
- Corporate Health and Safety Manager: Chris Carter (O: 206.436.5905; C: 206.618.0306)

3 Scope of Work

- The removal action consists of the advancement of angle borings to characterize contamination of soil within the Blue Wedge and the installation of a shoreline containment barrier. The following tasks associated with Phase 4A have been identified:
 - Pre-design field activities
 - Drilling Activities

- Soil sampling
- Construction observation

Table 5-1: Project Job Tasks and Required PPE

- Under the job task column, Sampling or Survey Activities needs to include soil sampling. Drilling Activities has been added as a Job Task to Table 5-1, and is presented below.

Job Task	PPE Requirements	
Drilling Activities	<input checked="" type="checkbox"/>	Traffic Safety Vest
	<input checked="" type="checkbox"/>	One-piece Chemical-resistant coverall
	<input checked="" type="checkbox"/>	Disposable inner gloves (latex or equivalent “surgical”)
	<input checked="" type="checkbox"/>	Disposable chemical-resistant outer gloves Material Type: Nitrile
	<input checked="" type="checkbox"/>	Chemical-resistant boots with safety toe and steel shank conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots Material Type: Non-absorptive
	<input checked="" type="checkbox"/>	Safety glasses
	<input checked="" type="checkbox"/>	Hard hat
	<input checked="" type="checkbox"/>	Hearing Protectors (REQUIRED when site noise levels are greater than 85 decibels based on an 8-hour time-weighted average). Type: Varies

7.4.1: Sediment and Water Quality Sampling Work Zones

- This section does not apply and should be replaced with Drilling and Construction Activities Work Zones. The new subsection contains guidelines concerning health and safety while conducting construction and drilling activities within uplands portions of the Jorgensen Forge Outfall Site. Two work zones will be observed during these activities. The first zone will encompass the area around active heavy equipment, such as a drill rig or excavator. Only the construction or drilling crew may enter this zone unless assistance by other personnel is required. The second work zone will be the sample processing/field observation area. The construction or drilling crew will enter this zone to communicate or deliver soil samples.

7.4.1.1 Vessel Decontamination Area

- This section should be renamed as Equipment Decontamination Area.

7.4.1.2 Access Control

- This section only applies to onshore/uplands work.

7.4.2 Working in a Roadway

- This section does not apply.

9.4 Transportation Worker Identification Credentials

- TWIC Credentials do not apply to upland operations

12.1.3 Sediment Core Sampling (Physical Hazards and Controls)

- This section should be renamed as Drilling Activities, and modified to reflect uplands soil sampling instead of in-vessel sediment coring.

12.1.11 Boating Operations

- This section does not apply.

Table 12-2

- This table does not apply.